

CLAIMS

1. An antenna screen printed on a rear window of a saloon type motor vehicle, having four radio reception functions, namely AM, FM1, FM2 and REMOTE KEYLESS ENTRY, and comprising:
- 5 - an AM antenna with an aerial made up of at least one horizontal conductive line located in the top or bottom part of the rear window and not involved in the de-icing function, the aerial of the AM antenna being associated with a first electronic circuit located in an electronic box and providing a high impedance matching of said aerial to a radio receiver;
 - 10 - FM1 and FM2 antennas having one and the same aerial made up of a number of horizontal conductive lines that are involved in the de-icing function, these two antennas having different signal collector points (12, 13), and each comprising a circuit of the electronic box providing impedance matching of their aerial to the characteristic impedance of the coaxial cable outgoing from the electronic box; and
 - 15 - a REMOTE KEYLESS ENTRY antenna having the same aerial as that of the AM antenna, a circuit of the electronic box providing impedance matching of the aerial of this antenna to the impedance of the coaxial cable outgoing from the box,
 - 20 characterized in that the aerial of the FM1 and FM2 antennas comprises, in addition to the de-icing network (2), two pairs of vertical lines (9, 10) disposed symmetrically relative to the median vertical longitudinal plane of the vehicle, the collector point (12) of the aerial (2, 9, 10) of the FM1 antenna being used to obtain a directional signal in the lengthwise direction of the vehicle in a plane of zero height, whereas the collector point (13) of the FM2 antenna is used to obtain a directional signal in the widthwise
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direction of the vehicle in a plane of zero height.

2. The screen printed antenna as claimed in claim 1,
5 characterized in that each pair (9, 10) of vertical lines is placed approximately 510 mm from the mid-point (6 or 13) of the corresponding de-icing collector (3 or 4).
- 10 3. The screen printed antenna as claimed in claim 1 or 2, characterized in that the electronic circuit of the FM1 antenna is a passive circuit whereas the electronic circuit of the FM2 antenna is an active circuit.
- 15 4. The screen printed antenna as claimed in any one of claims 1 to 3, characterized in that the electronic circuit of the AM antenna is an active circuit, and the electronic circuit of the REMOTE
20 KEYLESS ENTRY antenna is a passive circuit.
5. The screen printed antenna as claimed in any one of claims 1 to 4, characterized in that the electronic box (11) is made up of a single board
25 comprising the four electronic circuits of the FM1, FM2, AM and REMOTE KEYLESS ENTRY antennas, the collector points (12, 13, 16) of the signals on the aerials of these antennas being grouped in the same sector of the rear window of the vehicle
30 to make the length of the connecting wires (19, 14, 17) from the rear window (1) to the box (11) as short as possible.
- 35 6. The screen printed antenna as claimed in claim 5, characterized in that the electronic box (11) is fixed to the right or left strut of the vehicle, towards the bottom of the rear window (1).

7. The screen printed antenna as claimed in any one of the preceding claims, characterized in that it comprises a transmission line for the FM1 signal, made up of a thick screen printed ground line (20) and a screen printed line (22) linked to the FM1 aerial (9) to bring the FM1 signal from one corner to the opposite corner of the rear window (1).
8. The screen printed antenna as claimed in any one of the preceding claims, characterized in that the aerial of the AM and REMOTE KEYLESS ENTRY antennas is made up of two horizontal screen printed lines (15) in the bottom part of the rear window (1).
9. The screen printed antenna as claimed in any one of the preceding claims, characterized in that a filtering system (8) is placed between the electrical power supply battery (7) and the decoding network (2), this filtering system being made up of a capacitive element and an inductive element in series.

CLAIMS

1. An antenna screen printed on a window located at the rear of a saloon type motor vehicle and comprising a de-icing network (2) consisting of two collectors (3, 4) interlinked by a number of horizontal conductive lines (5), the antenna providing four radio reception functions, namely AM, FM1, FM2 and REMOTE KEYLESS ENTRY, and comprising:
- an AM antenna with an aerial made up of at least one horizontal conductive line (15) located in one of the top and bottom parts of the rear window and not included in the de-icing network (2), the aerial of the AM antenna being associated with a first electronic circuit located in an electronic box (11) and providing a high impedance matching of said aerial to a radio receiver;
 - FM1 and FM2 antennas having a common aerial made up of the de-icing network (2) and vertical lines (9, 10) and having different signal collector points (12, 13) that are used to obtain directional signals respectively in first and second directions in a plane of zero height, each antenna having a circuit located in the electronic box (11) and providing impedance matching of their aerial to the characteristic impedance of the coaxial cable outgoing from the electronic box, and
 - a REMOTE KEYLESS ENTRY antenna comprising an aerial and a circuit located in the electronic box (11) and providing impedance matching of its aerial to the impedance of the coaxial cable outgoing from the box,
- characterized in that:
- the vertical lines (9, 10) comprise two pairs of vertical lines disposed symmetrically relative

to the median vertical longitudinal plane of the vehicle;

- 5 - the signals supplied by the FM1 and FM2 antennas are respectively directional in the lengthwise direction of the vehicle and in the widthwise direction of the vehicle;
- the aerial of the REMOTE KEYLESS ENTRY antenna is the aerial of the AM antenna;
- 10 - the signal collector point (12) of the aerial of the FM1 antenna is located on a screen printed line (22) located in the bottom part of the rear window, alongside the electronic box (11);
- the signal collector point (13) of the aerial of the FM2 antenna is located at the mid-point of
- 15 the collector (4), disposed on the side of the electronic box, of the de-icing network (2); and
- the signal collector points (12, 13) are linked to the electronic box by connecting wires (19, 14).

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2. The screen printed antenna as claimed in claim 1, characterized in that each pair (9, 10) of vertical lines is placed approximately 510 mm from the mid-point (6 or 13) of the corresponding de-icing collector (3 or 4).

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3. The screen printed antenna as claimed in claim 1 or 2, characterized in that the electronic circuit of the FM1 antenna is a passive circuit whereas
- 30 the electronic circuit of the FM2 antenna is an active circuit.

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4. The screen printed antenna as claimed in any one of claims 1 to 3, characterized in that the
- 35 electronic circuit of the AM antenna is an active circuit, and the electronic circuit of the REMOTE KEYLESS ENTRY antenna is a passive circuit.

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5. The screen printed antenna as claimed in any one of claims 1 to 4, characterized in that the electronic box (11) is made up of a single board comprising the four electronic circuits of the FM1, FM2, AM and REMOTE KEYLESS ENTRY antennas, the collector points (12, 13, 16) of the signals on the aerials of these antennas being grouped in the same sector of the rear window of the vehicle to make the length of the connecting wires (19, 14, 17) from the rear window (1) to the box (11) as short as possible.
6. The screen printed antenna as claimed in claim 5, characterized in that the electronic box (11) is fixed to the right or left strut of the vehicle, towards the bottom of the rear window (1).
7. The screen printed antenna as claimed in any one of the preceding claims, characterized in that it comprises a transmission line for the FM1 signal, made up of a thick screen printed ground line (20) and the screen printed line (22) linked to the FM1 aerial (9) to bring the FM1 signal from one corner to the opposite corner of the rear window (1).
8. The screen printed antenna as claimed in any one of the preceding claims, characterized in that the aerial of the AM and REMOTE KEYLESS ENTRY antennas is made up of two horizontal screen printed lines (15) in the bottom part of the rear window (1).
9. The screen printed antenna as claimed in any one of the preceding claims, characterized in that a filtering system (8) is placed between the electrical power supply battery (7) and the de-icing network (2), this filtering system being made up of a capacitive element and an inductive element in series.